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EXAMINER

FLEURANTIN, JEAN B

ART UNIT PAPER NUMBER

2162

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Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Office Action Summary</b></p>	<b>Application No.</b> 09/229,849	<b>Applicant(s)</b> SERRANO, MARTIN	
	<b>Examiner</b> JEAN B. FLEURANTIN	<b>Art Unit</b> 2162	

**-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 September 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,2,4-11,13-20 and 22-39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 30,31,34,35,38 and 39 is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☒ Claim(s) 5,7, 14, 16 and 23,25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Claims 1, 2, 4-11, 13-20, 22-39 remain pending for examination.
2. Claim 30 has been corrected. Therefore, the objection is being withdrawn.

### ***Response to Applicant' Remarks***

3. Applicant's arguments filed 3 September 2004 have been fully considered but they are not persuasive for the following reasons: Applicant(s) stated that on page 17 that "neither reference, alone or in combination, teaches or suggests the invention as claimed." In response to applicant's argument that neither reference, alone or in combination, teaches or suggests the invention as claimed, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Ruf does not explicitly disclose the claimed an application program based on a script of a script-driven software tool, comprising automatically analyzing the script, and where such parallel computation specification provides functional equivalence to the script when executed by a parallel runtime system; parsing the script into statement. However, Bodin discloses the claimed a transformation script

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system, (see page 180, cot. 2, paragraph 5), further in see page 155, cot. 1, paragraphs 1 -3, Bodin discloses a pattern that describes the code fragments to match before applying the transformation script. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Ruf and Bodin with an application program based on a script of a script-driven software tool, comprising automatically analyzing the script, and where such parallel computation specification provides functional equivalence to the script when executed by a parallel runtime system; parsing the script into statement. Such modification would allow the teachings of Ruf and Bodin to improve the efficiency of the parallelization applications of script driven tools, and to provide the user with a modifiable transformation database, (see Bodin page 180 cot. 2, lines paragraph 5).

In response to applicant's argument that "Ruf does not teach or suggest how to produce a parallel computation specification based on such analysis." It is submitted that Ruf discloses steps of using types to partition dataflow analyses may also enable the performance of dataflow analyses in parallel for more than one separate phase of such non-separable programs. Suitable dataflow analyses that may be partitioned using types include points-to analysis (see Ruf col. 4, lines 26-33). Further, in column 11, lines 15-18, Ruf discloses dataflow analysis module may also perform the dataflow analysis for more than one program quantity in parallel in a multiprocessing or distributed operating.

Nothing in Bodin teaches or suggests parallelizing a computer application program based on a script of a script driven software tool, comprising automatically analyzing the script and producing a parallel computation specification based on such analysis.” It is submitted that Ruf discloses steps of using types to partition dataflow analyses may also enable the performance of dataflow analyses in parallel for more than one separate phase of such non-separable programs. Suitable dataflow analyses that may be partitioned using types include points-to analysis (see Ruf col. 4, lines 26-33); further see column 7, lines 11, lines 15-18.

In response to applicant's argument on page 18 that “neither Ruf nor Bodin, either alone or in combinations, teaches or suggests constructing a parallel dataflow graph that may be executed by a parallel runtime system.” It is submitted that Ruf discloses the claimed dataflow analysis module may also perform the dataflow analysis for more than one program quantity in parallel in a multiprocessing or distributed operating (see col. 11, lines 3-55).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4, 8-11, 13, 17-20, 22, 26-29, 32, 33, 36 and 37 are rejected under 35 U.S. C. 103 (a) as being unpatentable over U.S. Patent No. 6,077,313 issued to Ruf ("Ruf") in view of Francois Bodin et al. - A User Level Program Transformation Tool - 1998 ("Bodin").

As per claims 1 and 10, Ruf discloses, "a method for producing a parallel computation specification based on such analysis", (see col. 2, lines 48-52);

(b) "constructing a serial dataflow graph from the parsed statements, the serial dataflow graph having nodes connected by directed edges, the nodes representing datasets, processing steps, and intermediate results", (see col. 3, lines 16-22), and c) "constructing a parallel dataflow graph from the serial dataflow graph such that the parallel dataflow graph may be executed by a parallel runtime system" as also enable the performance of dataflow analyses in parallel for more than one separate phase of such a non separable program, (see col. 2, lines 48-52). Ruf does not explicitly disclose an application program based on a script of a script-driven software tool, comprising automatically analyzing the script, and where such parallel computation specification provides functional equivalence to the script when executed by a parallel

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runtime system; parsing the script into statement. However, Bodin discloses a transformation script system, (see page 180, col. 2, paragraph 5), further in see page 155, col. 1, paragraphs 1 -3, Bodin discloses a pattern that describes the code fragments to match before applying the transformation script. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Ruf and Bodin with an application program based on a script of a script-driven software tool, comprising automatically analyzing the script, and where such parallel computation specification provides functional equivalence to the script when executed by a parallel runtime system; parsing the script into statement. Such modification would allow the teachings of Ruf and Bodin to improve the efficiency of the parallelization applications of script driven tools, and to provide the user with a modifiable transformation database, (see page 180 col. 2, lines paragraph 5).

As per claims 2 and 11, in addition to claim 1, Ruf does not explicitly discloses analyzing the parallel dataflow graph to generate script fragments in a form that enables the script-driven software tool to execute some of the processing steps. However, Bodin discloses a pattern that describes the code fragments to match before applying the transformation script, (see page 185, col. 1, paragraph 1). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Ruf and Bodin with analyzing the parallel dataflow graph to generate script fragments in a form that enables the script-driven software tool to execute some of the processing steps. Such modification allow the teachings of Ruf and

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Bodin to provide the user with a script which realizes automatically a code instrumentation in order to gather information about the program execution at runtime, (see page 185, col. 2, paragraph 3).

As per claims 4, 13 and 22, in addition to claim 1, Ruf further discloses, "constructing a serial dataset access table indicating datasets in the dataset table used by statements in the processing step table", (see col. 3, lines 35-41).

As per claims 8, 17 and 26, the limitations of claims 8, 17 and 26 are rejected in the analysis of claim 1, and these claims are rejected on that basis.

As per claims 9 and 18, Ruf discloses, "wherein producing the parallel computation specification includes applying at least one pre-defined parallelization in rewrite algorithm selected from the group comprising simple partitioning, key-based partitioning, local-global division" (see col. 2, lines 32-35), "external parallelism algorithm, and statement", (see col. 3, lines 36-40).

As per claim 19, Ruf discloses, "a system for producing a parallel computation specification based on such analysis", (see col. 2, lines 48-52);

(b) "means for constructing a serial dataflow graph from the parsed statements, the serial dataflow graph having nodes connected by directed edges, the nodes



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representing datasets, processing steps, and intermediate results", (see col. 3, lines 16-22), and

c) "means for constructing a parallel dataflow graph from the nodes of the serial dataflow graph such that the parallel dataflow graph may be executed by a parallel runtime system" as also enable the performance of dataflow analyses in parallel for more than one separate phase of such a non separable program, (see col. 2, lines 48-52). Ruf does not explicitly disclose an application program based on a script of a script-driven software tool, comprising automatically analyzing the script, and where such parallel computation specification provides functional equivalence to the script when executed by a parallel runtime system; parsing the script into statement. However, Bodin discloses a transformation script system, (see page 180, col. 2, paragraph 5), further in page 155, col. 1, paragraphs 1-3, Bodin discloses a pattern that describes the code fragments to match before applying the transformation script. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Ruf and Bodin with an application program based on a script of a script-driven software tool, comprising automatically analyzing the script, and where such parallel computation specification provides functional equivalence to the script when executed by a parallel runtime system; parsing the script into statement. Such modification would allow the teachings of Ruf and Bodin to improve the efficiency of the parallelization applications of script-driven tools, and to provide the user with a modifiable transformation database, (see page 180 col. 2, lines paragraph 5).

As per claim 20, in addition to claim 1, Ruf does not explicitly disclose means for analyzing the parallel dataflow graph to generate script fragments in a form that enables the script-driven software tool to execute some of the processing steps. However, Bodin discloses a pattern that describes the code fragments to match before applying the transformation script, (see page 185, col. 1, paragraph 1). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Ruf and Bodin with means for analyzing the parallel dataflow graph to generate script fragments in a form that enables the script-driven software tool to execute some of the processing steps. Such modification allow the teachings of Ruf and Bodin to provide the user with a script which realizes automatically a code instrumentation in order to gather information about the program execution at runtime, (see page 185, col. 2, paragraph 3).

As per claim 27, Ruf discloses, "wherein the means for producing the parallel computation specification includes applying at least one pre-defined parallelization in rewrite algorithm selected from the group comprising simple partitioning, key-based partitioning, local global division" (see col. 2, lines 32-35), "external parallelism algorithm, and statement", (see col. 3, lines 36-40).

As per claims 28, 29, 32, 33, 36 and 37, in addition to claim 1, Ruf further discloses, "constructing a parallel dataflow graph from the serial dataflow graph" as enable the performance of dataflow analyses in parallel for more than one separate

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phase of such a non separable program, (see col. 2, lines 48-52). Ruf does not explicitly disclose constructing a serial dataset access table indicating datasets in the dataset table used by statements in the processing step table. However, Bodin discloses transformation script, in particular for building patterns and set of functions, that allows to generalize automatically a pattern, (see page 181, col. 1, paragraph 5). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combined teachings of Ruf and Bodin with constructing a serial dataset access table indicating datasets in the dataset table used by statements in the processing step table. Such modification allow the teachings of Ruf and Bodin to provide the user with a script which realizes automatically a code instrumentation in order to gather information about the program execution at runtime, (see page 185, col. 2, paragraph 3).

### ***Allowable Subject Matter***

5. Claims 5-7, 14-16 and 23-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. Claims 30, 31, 34, 35, 38 and 39 are allowed over the prior art of record.

The following is a statement of reasons for the indication of allowable subject matter:

As per claims 30, 31, 34, 35, 38 and 39, the prior art of record fails to teach or suggest the claimed features "a method for parallelizing a computer application program based on a script of a script-driven software tool, comprising automatically analyzing the script and producing a parallel computation specification based on such analysis, where such parallel computation specification provides functional equivalence to the script when executed by a parallel runtime system, by (iii) constructing a dataset access table based on the serial dataset access table; and (iv) determining, for each processing step identified in the parallel processing step table, if a corresponding pre-defined parallelization rewrite rule exists for such processing step, and if so, then applying the corresponding pre-defined parallelization rewrite rule to redefine associated entries in the parallel dataset table, the parallel processing step table, and the dataset access table as parallel processing entries; and if not, then defining such associated entries as serial processing entries; and (c) constructing a parallel dataflow graph from the serial dataflow graph" in conjunction with other elements of the independent claims would not found anticipated or obvious over the prior art made of record. Therefore, claims 30, 31, 34, 35, 38 and 39 are hereby allowed.

***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

### CONTACT INFORMATION


8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEAN B. FLEURANTIN whose telephone number is 571 – 272-4035. The examiner can normally be reached on 7:05 to 4:35.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BREENE can be reached on 571 – 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Jean Bolte Fleurantin

December 22, 2004

  
SHAHID ALAM  
PRIMARY EXAMINER